

CLAIMS

1. A process for forming, starting from a flow of products being fed forwards, groups or slugs of 5 products comprising a given number of products set on edge, each slug comprising, in the direction of advance, a first product and a last product, said process comprising the operations of:
- associating, to the first product of each group, 10 at least one first engagement element which is able to withhold said first product, preventing it from falling forwards in the direction of advance;
 - causing said products to advance according to a substantially horizontal stacking path, bringing about 15 the formation of said groups or slugs as a result of stacking of the products themselves up against said first product;
 - upon reaching, by said stacked products, said given number, associating, to the last product of the 20 slug that has been formed, at least one second engagement element; and
 - by means of said at least one second engagement element, exerting an action of thrust in the direction of advance so as to separate the slug of products thus 25 formed from a new slug of products being formed along said stacking path.
2. A process according to Claim 1, comprising the operation of tipping the products of said advancing flow, which are set flat, in such a way as to set them 30 on edge, said tipping action being performed in a given region before stacking, and wherein said at least one first engagement element and said at least one second engagement element are inserted in said flow of products being fed forwards in a position corresponding 35 to said tipping region.

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3. A process according to Claim 1, comprising the operation of providing a conveyor device which acts in alignment with said stacking path and is provided with corresponding engagement elements ordered in pairs,
5 each pair comprising a first engagement element and a second engagement element which are designed to engage, respectively, the last product and the first product in said slugs of products.
 4. A process according to Claim 3, comprising the
10 operation of configuring the second engagement element of said pairs as an element that is able to co-operate with said products in a relationship of elastic compliance.
 5. A process according to Claim 3, comprising the
15 operations of:
 - disengaging said at least one first engagement element from said first product when said first product is taken up by the second engagement element of a pair of engagement elements of said conveyor device; and
 - 20 - disengaging said at least one second engagement element from said last product when said last product is taken up by the first engagement element of a pair of engagement elements of said conveyor device.
 6. A process according to Claim 1, comprising the
25 operation of causing said products to advance along said stacking path by means of a movable conveying structure, said movable conveying structure having an overall filiform configuration.
 7. A process according to Claim 1, for conveying
30 products orderly arranged in input flows which may present discontinuities, comprising the operations of:
 - ordering said products according to at least one first flow and at least one second flow;
 - 35 - monitoring the number of products included in said first flow and said second flow, detecting the

occurrence of situations of imbalance in which one of said flows is richer than the other by a given number of products; and

5 - intervening on said first flow and said second flow in the presence of said situations of imbalance by transferring at least one product from said richer flow to said poorer flow.

8. A process according to Claim 7, wherein said given number of products is chosen as equal to two.

10 9. A process according to Claim 7, wherein after said transfer of at least one product from said richer flow to said poorer flow, said first flow and said second flow are merged into a single flow.

15 10. A process according to Claim 7, wherein at least one between said first flow and said second flow is obtained by merging together at least two of said input flows.

20 11. A device for forming, starting from a flow of advancing products, groups or slugs comprising a given number of products set on edge, each slug comprising, in the direction of advance, a first product and a last product, said device comprising:

25 - at least one first engagement element which is able to follow the movement of advance of the products and to withhold the first product of said slug of products, preventing it from falling forwards in the direction of advance;

30 - a stacking structure which is substantially horizontal and in which said advancing products pile up against said first product, forming said slug; and

35 - at least one second engagement element which is able to co-operate with the last product in said slug and to exert a thrust on said last product in said direction of advance in such a way as to separate it from the first product of a next slug being formed in

said stacking structure.

12. A device according to Claim 11, comprising a tipping device which is able to receive said products set flat down to tip them up and set them on their edges, and wherein at least one first engagement element and said at least one second engagement element carry associated to them respective drives which are able to insert said at least one first engagement element and said at least one second engagement element in said flow of advancing products in a position corresponding to said tipping device.

13. A device according to Claim 11, comprising a conveyor acting in a position corresponding to said stacking structure and provided with respective engagement elements ordered in pairs, each pair comprising a first engagement element and a second engagement element designed to engage, respectively, the last product and the first product of said slug of products.

14. A device according to Claim 13, wherein at least said second engagement element of said pairs is configured as an elastically compliant structure during co-operation with said products.

15. A device according to Claim 13, comprising a control unit which controls movement of said at least one first engagement element, of said at least one second engagement element, and of said conveyor, selectively bringing about:

- disengagement of said at least one first engagement element from said first product when said first product enters into a relationship of co-operation with the second engagement element of a pair of engagement elements associated to said conveyor; and
- disengagement of said at least one second engagement element from said last product when said

last product enters into a relationship of co-operation with the first engagement element of a pair of engagement elements associated to said conveyor.

16. A device according to Claim 11, comprising, in
5 a position corresponding to said stacking structure, at least one conveying element for conveying said products (P) which has an overall filiform structure.

17. A device according to Claim 11, wherein at least one first engagement element is associated to a
10 motor-driven loop formation having an active branch that is co-extensive with said stacking structure.

18. A device according to Claim 17, wherein said at least one first engagement element consists of a tooth which is mounted on said motor-driven loop formation
15 and which is able to project towards the inside of the stacking structure so as to be able to act on the products that are found inside the structure itself.

19. A device according to Claim 11, wherein said at least one second engagement element is associated to a
20 motor-driven loop formation having an active branch that is co-extensive with said stacking structure.

20. A device according to Claim 19, wherein said at least one second engagement element consists of a tooth which is mounted on said motor-driven loop formation
25 and which is able to project towards the inside of the stacking structure so as to be able to act on the products that are found inside the structure itself.

21. A device according to Claim 11, for conveying products orderly arranged in input flows which may
30 present discontinuities, comprising:

- conveying means for forming at least one first flow and one second flow of said products;
- sensing means for monitoring the number of products comprised in said first flow and said second flow and for detecting the occurrence of situations of

imbalance in which one of said flows is richer than the other by a given number of products; and

- 5 - transfer means which are able to intervene on said first flow and said second flow in the presence of
said situations of imbalance in order to transfer at least one product from said richer flow) to said poorer flow.

10 22. A device according to Claim 21, wherein said transfer means are configured in such a way as to intervene in the presence of a said given number of products equal to two.

15 23. A device according to Claim 21 further comprising an output conveyor in which said at least one first flow and said at least one second flow converge downstream of said transfer means.

24. A device according to Claim 21, comprising a confluence device for causing a plurality of said input flows to converge into at least one between said first flow and said second flow.

20 25. A device according to Claim 21, wherein said transfer means comprise:

- a first conveyor and a second conveyor for conveying said products;

25 - a first transfer unit that is able to transfer selectively said products from said first conveyor to said second conveyor; and

- a second transfer unit that is able to transfer selectively said products from said second conveyor to said first conveyor.

30 26. A device according to Claim 25, wherein:

- said first conveyor and said second conveyor convey said products in a common direction; and

35 - said first transfer unit and said second transfer unit act in respective directions that are generically oblique with respect to said common direction of

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conveyance of said first conveyor and said second conveyor.

27. A device according to Claim 25, wherein said first transfer unit and said second transfer unit each 5 have a respective end set upstream and a respective end set downstream, the former upstream end being located in a position corresponding to the conveyor starting from which selective transfer of said products is made by said transfer units, and the latter downstream end 10 being located in a position corresponding to the conveyor towards which selective transfer of said products is made by said transfer units.

28. A device according to Claim 25 further comprising a third conveyor set between said first conveyor and said second conveyor, said third conveyor being mobile in a concordant and synchronized way with 15 said first conveyor and said second conveyor so as to define a transfer path of said products between said first conveyor and said second conveyor, said third conveyor 20 being able to move together with said first conveyor and said second conveyor in the absence of relative movement with respect to the said conveyors.

29. A device according to Claim 28, wherein said third conveyor comprises channel-like formations which 25 are able to define channels for transfer of said products between said first conveyor and said second conveyor.

30. A device according to Claim 25, wherein said first transfer unit and said second transfer unit 30 comprise active elements which are able to act on said products, promoting their movement in a direction that is transverse with respect to said first conveyor and said second conveyor.

31. A device according to Claim 25, wherein said 35 first transfer unit and said second transfer unit

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comprise a motor-driven drawing structure provided with at least one engagement formation that is able to act on said products, promoting their transfer between said first conveyor and said second conveyor.

5 32. A device according to Claim 21, comprising, arranged downstream of said transfer means, a further conveyor which is able to act on said at least one first flow and said at least one second flow depending upon the accumulation, according to substantially
10 identical modalities for said first flow and said second flow.

33. A device according to Claim 11 for conveying products orderly arranged in input flows which may present discontinuities, comprising:

- 15 - conveying means for forming at least one first flow and one second flow of said products;
- sensing means for monitoring the number of products comprised in said first flow and said second flow and for detecting the occurrence of situations of imbalance in which one of said flows is richer than the other by a given number of products; and
20 - transfer means which are able to intervene on said first flow and said second flow in the presence of said situations of imbalance in order to transfer at least one product from said richer flow) to said poorer flow, and wherein said at least one first engagement element and said at least one second engagement element act downstream of said transfer means in the direction of advance of the products.